

REMARKS

Summary

This Amendment is responsive to the Office Action mailed on September 20, 2004. Claims 1, 10, 20, 32, 41, 51, 63, and 64 are amended. Claims 1, 2, 6-20, 22-28, 30-33, 37-51, 53-59, and 61-64 are pending.

Claims 1, 2, 6, 8, 9-12, 15-17, 19, 20, 22-24, 26, 28, 32, 33, 37, 39-43, 46-48, 50, 51, 53-55, 57, 59, 63, and 64 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jacquin (5,764,803) in view of Borah (US 4,755,045).

Claims 25 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jacquin in view of Maeng (US 6,476,873).

Claims 27 and 58 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jacquin in view of Borah and "Lossy/Lossless Region-of-Interest Coding Based on Set of Partitioning in Hierarchical Trees" by Atsumi.

Claims 14 and 45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jacquin in view of Borah and Krishnamurthy (US 6,256,423).

Claims 7, 13, 38, and 44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jacquin in view of Borah and Garland (US 6,144,772).

Claims 18 and 49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jacquin in view of Borah and Das (US 5,896,176).

Claims 30, 31, 61 and 62 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jacquin in view of Borah and Dunn (US 6,356,664).

Applicants respectfully traverse these rejections in view of the amended claims and the following comments.

Discussion of Amended Claims

Independent claims 1 and 32 are amended to specify that a size of the identified areas of interest corresponds to an angular coverage of an average human fovea at a predetermined viewing distance (see, e.g., Applicants' specification, page 28, line 22 through page 29, line 2).

Claims 10 and 41 are amended to clarify that the histogram is used to determine the most popular identified areas of interest, and that the most popular identified areas of interest are encoded at the first quality level.

Independent claims 20 and 51 are amended by deleting subject matter previously added thereto by amendment.

Independent claims 63 and 64 are amended to include the subject matter of claim 10, namely creating a histogram of the identified areas of interest to determine the most popular areas of interest and encoding the most popular areas of interest at the first (higher) quality level.

Discussion of Pending Claims and Prior Art

A. Rejection of Independent Claims 1 and 32 in view of Jacquin and Borah

Independent claims 1 and 32 are amended to specify that a size of the identified areas of interest corresponds

to an angular coverage of an average human fovea at a predetermined viewing distance. By sizing the identified areas of interest in accordance with the angular coverage of the human fovea, it is possible to present the perception of a high quality image everywhere. This is because the area outside of a viewers' central area of foveal vision (visual axis which affords acute or high-resolution vision) does not contribute to the viewer's perceived resolution of the image.

As acknowledged by the Examiner, Jacquin does not disclose that the areas of interest are identified by a group of viewers. Rather, the areas of interest in Jacquin are identified by an ellipse identifier. Further, there is no disclosure or suggestion in Jacquin regarding the determination of the size of the areas of interest or the size of the ellipses used to determine the areas of interest.

Accordingly, there is no disclosure or suggestion in Jacquin that a size of the identified areas of interest corresponds to an angular coverage of an average human fovea at a predetermined viewing distance, as claimed by Applicants in claims 1 and 32.

Further, Borah does not cure the deficiencies of Jacquin in this regard. Borah is directed towards using eye-gaze tracking mechanisms to gauge the effectiveness of a visual presentation. In Borah, points of visual fixation are identified. These points are then used to identify areas of interest within a scene. There is no disclosure in Borah regarding the size of these areas of interest. Further, there is no disclosure in Borah of encoding the

identified areas of interest. In particular, there is no disclosure or suggestion in Borah that a size of the identified areas of interest that are encoded at a higher quality level corresponds to an angular coverage of an average human fovea at a predetermined viewing distance, as claimed by Applicants in claims 1 and 32.

B. Rejection of Independent claims 20 and 51 in View of Jacquin and Borah

With the invention described in Applicants' amended claims 20 and 51, different areas of the image are encoded for transmission to a decoder in different data streams. In particular, the identified areas of interest are encoded for transmission in one (or more) data stream(s) and the unidentified areas are encoded for transmission in another separate data stream. With Applicants' claimed invention, there is no overlap of content between the data streams containing the identified and unidentified areas of interest, as the data stream containing the unidentified areas does not contain any information needed to recreate the identified areas of interest. The Examiner points to first coder 32 and second coder 34 of Jacquin as being equivalent to this claimed subject matter (Office Action, page 6 & 10). Applicants respectfully submit that the Examiner has misconstrued the disclosure of Jacquin.

The first coder 32 of Jacquin is used to encode blocks identified on list of blocks which are within the ellipses and the second coder 34 is used to encode blocks identified on a list of blocks which are not within the ellipses (Col. 9, line 63 through Col. 10, line 9; Figure 1). As shown in

Figure 1, the encoded data from the first and second encoders are combined to provide a single encoded data stream. In contrast, with Applicants' claimed invention, the identified areas of interest are encoded for transmission to a decoder in one or more data streams and the unidentified areas of interest are encoded for transmission to the decoder in a separate data stream from those containing the identified areas of interest. There is no disclosure or suggestion in Jacquin that the data stream produced by the first coder is transmitted to a decoder separate from the data stream produced by the second coder.

In particular, Jacquin does not disclose or suggest encoding the identified areas of interest at a first quality level for transmission to a decoder in one or more additional data streams, and encoding the unidentified areas of the image at a second and lower quality level than the identified areas for transmission to the decoder in a separate data stream from that containing the identified areas, as set forth in Applicants' amended claims 20 and 51.

Borah does not cure the deficiencies of Jacquin in this regard, as Borah does not disclose or remotely suggest encoding or transmitting of encoded images to a decoder.

C. Rejection of Claims 10, 41, 63 and 64 in View of Jacquin and Borah

Independent claims 63 and 64 are amended to include the subject matter of claim 10 (which is analogous to claim 41). The Examiner has indicated that Borah discloses the subject matter of Applicants' claim 10. In particular, the Examiner indicates that Borah discloses "a visual histogram

to determine the most popular areas according to the location of fixation points (see Figures 1, 2, and 6)" (Office Action, page 5). Applicants' respectfully disagree with the Examiner's characterization of Borah.

Figures 1, 2, and 6 of Borah relied on by the Examiner illustrate an image frame or scene. Visual fixation points obtained from tracking viewers' eye gaze are superimposed on the scenes. Contrary to the Examiner's assertions, visual fixation points superimposed on a scene is not equivalent to a histogram. A histogram may be defined as "A graphic representation of the frequency distribution of a continuous variable. Rectangles are drawn in such a way that their bases lie on a linear scale representing different intervals, and their heights are proportional to the frequencies of the values within each of the intervals." (www.cdc.gov/reproductivehealth/epi_gloss.htm; see also, definition of Histogram at Merriam-Webster Online Dictionary, www.m-w.com).

Figures 1, 2 and 6 of Borah do not disclose any graphical representation of the visual fixation data. In these Figures, fixation points are merely superimposed on the scene itself. Accordingly, Borah does not disclose or suggest that a histogram is used to determine the most popular identified areas of interest. Further, as Borah does not disclose any encoding of the areas of interest, Borah cannot disclose that the most popular identified areas of interest as determined by the histogram are encoded at the first quality level.

Jacquin does not cure the deficiencies of Borah, as Jacquin only discloses encoding all areas of interest at

the same quality level. There is no disclosure or suggestion in either Jacquin or Borah of identifying areas of interest, and then making a determination, using a histogram, of which of those identified areas of interest are the most popular so that the most popular areas of interest can be encoded at a higher quality level, and remaining areas of each image can be encoded at a second and lower quality level, as set forth in Applicant's claims 10, 41, 63 and 64.

D. Examiner's Combination of Jacquin and Borah

Applicants respectfully submit that there is no motivation for one skilled in the art to combine Jacquin and Borah. Jacquin discloses a computerized method whereby areas of interest are identified using a predetermined shape such as an ellipse. By such a method, Jacquin teaches away from using eye-gaze tracking as a means of identifying areas of interest in an image so that these areas can be encoded at a higher quality level. Borah is directed towards using eye-gaze tracking mechanisms to gauge the effectiveness of a visual presentation. Borah is not concerned with encoding of images. In fact, Borah makes no mention of any encoding process at all.

Further, Jacquin is directed at reducing the total bit rate by encoding only identified areas of an image at a high quality level, rather than encoding the entire image at a high quality level. In contrast, Borah is directed at evaluating the effectiveness of a visual presentation by tracking viewers' eye movements. Accordingly, the aim and function of the respective concepts disclosed in Jacquin

and Borah are completely disparate and are not related. The only point connecting the two references is the identifying of certain areas in an image. How and why this identification is done is unique to each disclosure.

Accordingly, only with hindsight gained impermissibly from Applicants' disclosure could one of ordinary skill in the art arrive at the conclusions reached by the Examiner.

Applicants respectfully submit that the present invention would not have been obvious to one skilled in the art in view of Jacquin, taken alone or in combination with Borah or any of the other prior art references of record.

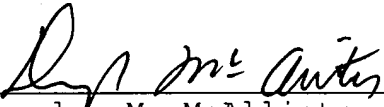
Further remarks regarding the asserted relationship between Applicants' claims and the prior art are not deemed necessary, in view of the amended claims and the foregoing discussion. Applicants' silence as to any of the Examiner's comments is not indicative of an acquiescence to the stated grounds of rejection.

Withdrawal of the rejections under 35 U.S.C. § 103(a) is therefore respectfully requested.

Conclusion

The Examiner is respectfully requested to reconsider this application, allow each of the pending claims and to pass this application on to an early issue. If there are any remaining issues that need to be addressed in order to place this application into condition for allowance, the Examiner is requested to telephone Applicants' undersigned attorney.

Respectfully submitted,



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